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SEASONAL VARIATION AND SOLAR ACTIVITY DEPENDENCE OF THE QUIET-TIME IONOSPHERIC TROUGH

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We have conducted a statistical analysis of the ionospheric F region trough, focusing on its seasonal variation and solar activity dependence under geomagnetically quiet and moderate conditions, using plasma parameter obtained via Common Program 3 observations performed by the European Incoherent Scatter (EISCAT) Tromsø UHF radar between 1982 and 2011.

The statistical results on seasonal variation indicated that frictional heating plays a crucial role in the trough formation in the sunlit region. Moreover, we have also obtained the results that solar activity dependence of the field-aligned current could influence the occurrence rate of the trough. In this paper, we show these results and discuss the plausible mechanism on seasonal variation and solar activity dependence of the trough.

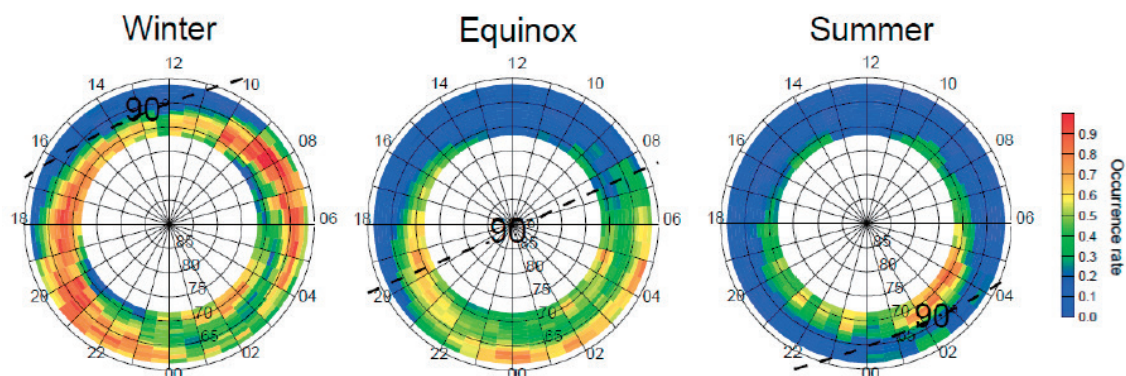


Figure. The occurrence rate of the trough divided into three seasons. The black dashed line in each polar plot indicates the average solar terminator, where the solar zenith equals 90° .